

WHAT IS CLAIMED IS:

1. A metal comprising:
a substrate with an exterior surface; and
5 a protective biofilm positioned on said exterior surface that reduces corrosion
of said exterior surface;
wherein said metal is not steel, copper or aluminum.
2. The metal of Claim 1, wherein said metal is brass UNS-C26000.
- 10 3. The metal of Claim 1, wherein said biofilm is a bacterium.
4. The metal of Claim 3, wherein said bacterium is an aerobe.
- 15 5. The metal of Claim 4, wherein said bacterium is *Bacillus subtilis* or *Bacillus licheniformis*.
6. The metal of Claim 1, wherein said biofilm is between about 10 μm and about
20 μm thick.
7. A method for reducing metal corrosion comprising:
providing a metal with an exterior surface;
applying on said exterior surface a protective biofilm that reduces corrosion of
said exterior surface;
25 wherein said metal is not copper, aluminum or steel.
8. The method of Claim 7, wherein said providing step includes the step of
providing a metal that is brass UNS-C26000.
- 30 9. The method of Claim 7, wherein said applying step includes the step of
applying a protective biofilm that is a bacterium.

10. The method of Claim 9, wherein said applying step includes the step of applying a bacterium that is an aerobe.
11. The method of Claim 10, wherein said applying step includes the step of
5 applying a bacterium that is *Bacillus subtilis* or *Bacillus licheniformis*.
12. The method of Claim 7, wherein said applying step includes the step of applying a protective biofilm that is between about 10 μm and about 20 μm thick.
- 10 13. The method of Claim 7, wherein said providing step includes the step of providing a metal that is immersed in a liquid.
14. The method of Claim 13, wherein said providing step includes the step of providing a metal that is immersed in artificial seawater or Luria-Bertani medium.
- 15 15. A metal comprising:
a substrate with an exterior surface; and
a protective biofilm positioned on said exterior surface that reduces corrosion of said exterior surface;
- 20 wherein said protective biofilm is a bacterium that secretes a polyanionic chemical composition.
16. The metal of Claim 15, wherein said metal is selected from the group consisting of aluminum, aluminum alloy, copper, a copper alloy, titanium, a titanium
25 alloy, nickel and a nickel alloy.
17. The metal of Claim 15, wherein said metal is steel.
18. The metal of Claim 17, wherein said steel is mild steel-1010.
- 30 19. The metal of Claim 15, wherein said bacterium is an aerobe.

20. The metal of Claim 19, wherein said bacterium is *E. coli*.
21. The metal of Claim 15, wherein said bacterium has been genetically engineered to secrete the polyanionic chemical composition.
- 5 22. The metal of Claim 15, wherein said polyanionic chemical composition is polyphosphate.
23. The metal of Claim 15, wherein said biofilm is between about 10 μm and
10 about 20 μm thick.
24. A method for reducing corrosion comprising:
providing a metal with an exterior surface;
applying on said exterior surface a protective biofilm that reduces corrosion of
15 said exterior surface;
wherein said protective biofilm is a bacterium that secretes a polyanionic chemical composition.
25. The method of Claim 24, wherein said providing step includes the step of
20 providing a metal that is selected from the group consisting of aluminum, a aluminum alloy, copper, copper alloy, titanium, a titanium alloy, nickel and a nickel alloy.
26. The method of Claim 24, wherein said providing step includes the step of
25 providing a metal that is steel.
27. The method of Claim 26, wherein said providing step includes the step of
providing a metal that is mild steel-1010.
28. The method of Claim 24, wherein said applying step includes the step of
30 applying a bacterium that is an aerobe.

29. The method of Claim 28, wherein said applying step includes the step of applying a bacterium that is *E. coli*.

30. The method of Claim 24, wherein said applying step includes the step of
5 applying a bacterium that has been genetically engineered to secrete the polyanionic chemical composition.

31. The method of Claim 24, wherein said applying step includes the step of applying a polyanionic chemical composition that is polyphosphate.
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32. The method of Claim 24, wherein said applying step includes the step of applying a biofilm that is between about 10 μm and about 20 μm thick.

33. The method of Claim 24, wherein said providing step includes the step of
15 providing a metal that is immersed in a liquid.

34. The method of Claim 24, wherein said providing step includes the step of providing a metal that is immersed in artificial seawater or Luria-Bertani medium.